

```
entry:
  call void @llvm.dbg.value(metadata ptr %a, metadata !21, metadata
  ... !DIExpression()), !dbg !27
  call void @llvm.dbg.value(metadata ptr %b, metadata !22, metadata
  ... !DIExpression()), !dbg !27
  call void @llvm.dbg.value(metadata ptr %c, metadata !23, metadata
  ... !DIExpression()), !dbg !27
  call void @llvm.dbg.value(metadata i32 %n, metadata !24, metadata
  ... !DIExpression()), !dbg !27
  call void @llvm.dbg.value(metadata i32 0, metadata !25, metadata
  ... !DIExpression()), !dbg !28
  %cmp11 = icmp sgt i32 %n, 0, !dbg !29
  br i1 %cmp11, label %for.body.preheader, label %for.cond.cleanup, !dbg !31
```

```
for.body.preheader:
  %wide.trip.count = zext i32 %n to i64, !dbg !29
  br label %for.body.init.1
```

```
for.body.init.1:
  call void @llvm.dbg.value(metadata i64 0, metadata !25, metadata
  ... !DIExpression()), !dbg !28
  %rem15.init.1 = and i64 0, 1, !dbg !32
  %cmp1.not.init.1 = icmp eq i64 %rem15.init.1, 0, !dbg !32
  %indvars.iv.next.init.1 = add nuw nsw i64 0, 1, !dbg !35
  %rem15.headerCopy.1.init.1 = and i64 %indvars.iv.next.init.1, 1, !dbg !32
  %cmp1.not.headerCopy.1.init.1 = icmp eq i64 %rem15.headerCopy.1.init.1, 0,
  ... !dbg !32
  %indvars.iv.next.latchCopy.1.init.1 = add nuw nsw i64
  ... %indvars.iv.next.init.1, 1, !dbg !35
  %rem15.headerCopy.1.2.init.1 = and i64 %indvars.iv.next.latchCopy.1.init.1,
  ... 1, !dbg !32
  %cmp1.not.headerCopy.1.2.init.1 = icmp eq i64 %rem15.headerCopy.1.2.init.1,
  ... 0, !dbg !32
  %indvars.iv.next.latchCopy.1.2.init.1 = add nuw nsw i64
  ... %indvars.iv.next.latchCopy.1.init.1, 1, !dbg !35
  %rem15.headerCopy.1.2.3.init.1 = and i64
  ... %indvars.iv.next.latchCopy.1.2.init.1, 1, !dbg !32
  %cmp1.not.headerCopy.1.2.3.init.1 = icmp eq i64
  ... %rem15.headerCopy.1.2.3.init.1, 0, !dbg !32
  %indvars.iv.next.latchCopy.1.2.3.init.1 = add nuw nsw i64
  ... %indvars.iv.next.latchCopy.1.2.init.1, 1, !dbg !35
  br label %for.body.init.2
```

```
for.body.init.2:
  call void @llvm.dbg.value(metadata i64 0, metadata !25, metadata
  ... !DIExpression()), !dbg !28
  %rem15.init.2 = and i64 %indvars.iv.next.latchCopy.1.2.3.init.1, 1, !dbg !32
  %cmp1.not.init.2 = icmp eq i64 %rem15.init.2, 0, !dbg !32
  %indvars.iv.next.init.2 = add nuw nsw i64
  ... %indvars.iv.next.latchCopy.1.2.3.init.1, 1, !dbg !35
  %rem15.headerCopy.1.init.2 = and i64 %indvars.iv.next.init.2, 1, !dbg !32
  %cmp1.not.headerCopy.1.init.2 = icmp eq i64 %rem15.headerCopy.1.init.2, 0,
  ... !dbg !32
  %indvars.iv.next.latchCopy.1.init.2 = add nuw nsw i64
  ... %indvars.iv.next.init.2, 1, !dbg !35
  %rem15.headerCopy.1.2.init.2 = and i64 %indvars.iv.next.latchCopy.1.init.2,
  ... 1, !dbg !32
  %cmp1.not.headerCopy.1.2.init.2 = icmp eq i64 %rem15.headerCopy.1.2.init.2,
  ... 0, !dbg !32
  %indvars.iv.next.latchCopy.1.2.init.2 = add nuw nsw i64
  ... %indvars.iv.next.latchCopy.1.init.2, 1, !dbg !35
  %rem15.headerCopy.1.2.3.init.2 = and i64
  ... %indvars.iv.next.latchCopy.1.2.init.2, 1, !dbg !32
  %cmp1.not.headerCopy.1.2.3.init.2 = icmp eq i64
  ... %rem15.headerCopy.1.2.3.init.2, 0, !dbg !32
  %indvars.iv.next.latchCopy.1.2.3.init.2 = add nuw nsw i64
  ... %indvars.iv.next.latchCopy.1.2.init.2, 1, !dbg !35
  %0 = insertelement <vscale x 4 x i1> undef, i1 %cmp1.not.init.1, i64 0
  %1 = insertelement <vscale x 4 x i1> %0, i1 %cmp1.not.headerCopy.1.init.1,
  ... i64 1
  ... i64 1
  %2 = insertelement <vscale x 4 x i1> %1, i1 %cmp1.not.headerCopy.1.2.init.1,
  ... i64 2
  %3 = insertelement <vscale x 4 x i1> %2, i1
  ... %cmp1.not.headerCopy.1.2.3.init.1, i64 3
  %4 = insertelement <vscale x 4 x i1> undef, i1 %cmp1.not.init.2, i64 0
  %5 = insertelement <vscale x 4 x i1> %4, i1 %cmp1.not.headerCopy.1.init.2,
  ... i64 1
  ... i64 1
  %6 = insertelement <vscale x 4 x i1> %5, i1 %cmp1.not.headerCopy.1.2.init.2,
  ... i64 2
  %7 = insertelement <vscale x 4 x i1> %6, i1
  ... %cmp1.not.headerCopy.1.2.3.init.2, i64 3
  %8 = call <vscale x 4 x i32> @llvm.aarch64.sve.index.nxv4i32(i32 0, i32 1)
  %9 = call <vscale x 4 x i32> @llvm.aarch64.sve.index.nxv4i32(i32 4, i32 1)
  br label %for.body
```

```
for.body:
  %24 = phi i64 [ %indvars.iv.next.latchCopy.1.2.3.%new.latch ], [ 8,
  ... %for.body.init.2 ]
  %25 = phi <vscale x 4 x i32> [ %78, %new.latch ], [ %8, %for.body.init.2 ]
  %26 = phi <vscale x 4 x i1> [ %79, %new.latch ], [ %3, %for.body.init.2 ]
  %27 = phi <vscale x 4 x i32> [ %80, %new.latch ], [ %9, %for.body.init.2 ]
  %28 = phi <vscale x 4 x i1> [ %81, %new.latch ], [ %7, %for.body.init.2 ]
  call void @llvm.dbg.value(metadata i64 0, metadata !25, metadata
  ... !DIExpression()), !dbg !28
  %rem15 = and i64 %24, 1, !dbg !32
  %cmp1.not = icmp eq i64 %rem15, 0, !dbg !32
  %indvars.iv.next = add nuw nsw i64 %24, 1, !dbg !35
  %rem15.headerCopy.1 = and i64 %indvars.iv.next, 1, !dbg !32
  %cmp1.not.headerCopy.1 = icmp eq i64 %rem15.headerCopy.1, 0, !dbg !32
  %indvars.iv.next.latchCopy.1 = add nuw nsw i64 %indvars.iv.next, 1, !dbg !35
  %rem15.headerCopy.1.2 = and i64 %indvars.iv.next.latchCopy.1, 1, !dbg !32
  %cmp1.not.headerCopy.1.2 = icmp eq i64 %rem15.headerCopy.1.2, 0, !dbg !32
  %indvars.iv.next.latchCopy.1.2 = add nuw nsw i64
  ... %indvars.iv.next.latchCopy.1, 1, !dbg !35
  %rem15.headerCopy.1.2.3 = and i64 %indvars.iv.next.latchCopy.1.2, 1, !dbg !32
  %cmp1.not.headerCopy.1.2.3 = icmp eq i64 %rem15.headerCopy.1.2.3, 0, !dbg !32
  %indvars.iv.next.latchCopy.1.2.3 = add nuw nsw i64
  ... %indvars.iv.next.latchCopy.1.2, 1, !dbg !35
  %29 = icmp uge i64 %indvars.iv.next.latchCopy.1.2.3, %wide.trip.count, !dbg
  ... !29
  br i1 %29, label %epilogueBlock1, label %permute.decision, !dbg !31,
  ... !llvm.loop !41
```

```
epilogueBlock1:
  %10 = getelementptr inbounds i32, ptr %a, i64 %24, !dbg !36
  %11 = getelementptr inbounds i32, ptr %b, i64 %24, !dbg !38
  %12 = getelementptr inbounds i32, ptr %c, i64 %24, !dbg !39
  %13 = call <vscale x 4 x i32>
  ... @llvm.aarch64.sve.ld1.gather.sxtw.index.nxv4i32(<vscale x 4 x i1> %26, ptr
  ... %10, <vscale x 4 x i32> %25)
  %14 = call <vscale x 4 x i32>
  ... @llvm.aarch64.sve.ld1.gather.sxtw.index.nxv4i32(<vscale x 4 x i1> %26, ptr
  ... %11, <vscale x 4 x i32> %25)
  %15 = call <vscale x 4 x i32> @llvm.aarch64.sve.mul.nxv4i32(<vscale x 4 x
  ... i1> %26, <vscale x 4 x i32> %14, <vscale x 4 x i32> %13)
  call void @llvm.aarch64.sve.st1.scatter.sxtw.nxv4i32(<vscale x 4 x i32> %15,
  ... <vscale x 4 x i1> %26, ptr %12, <vscale x 4 x i32> %25)
  %16 = zext <vscale x 4 x i32> %25 to <vscale x 4 x i64>
  call void @llvm.aarch64.sve.st1.scatter.sxtw.nxv4i32(<vscale x 4 x i32> %25,
  ... <vscale x 4 x i1> %26, ptr %12, <vscale x 4 x i32> %25)
  br label %epilogueBlock2
```

```
epilogueBlock2:
  %17 = getelementptr inbounds i32, ptr %a, i64 %24, !dbg !36
  %18 = getelementptr inbounds i32, ptr %b, i64 %24, !dbg !38
  %19 = getelementptr inbounds i32, ptr %c, i64 %24, !dbg !39
  %20 = call <vscale x 4 x i32>
  ... @llvm.aarch64.sve.ld1.gather.sxtw.index.nxv4i32(<vscale x 4 x i1> %28, ptr
  ... %17, <vscale x 4 x i32> %27)
  %21 = call <vscale x 4 x i32>
  ... @llvm.aarch64.sve.ld1.gather.sxtw.index.nxv4i32(<vscale x 4 x i1> %28, ptr
  ... %18, <vscale x 4 x i32> %27)
  %22 = call <vscale x 4 x i32> @llvm.aarch64.sve.mul.nxv4i32(<vscale x 4 x
  ... i1> %28, <vscale x 4 x i32> %21, <vscale x 4 x i32> %20)
  call void @llvm.aarch64.sve.st1.scatter.sxtw.nxv4i32(<vscale x 4 x i32> %22,
  ... <vscale x 4 x i1> %28, ptr %19, <vscale x 4 x i32> %27)
  %23 = zext <vscale x 4 x i32> %27 to <vscale x 4 x i64>
  call void @llvm.aarch64.sve.st1.scatter.sxtw.nxv4i32(<vscale x 4 x i32> %27,
  ... <vscale x 4 x i1> %28, ptr %19, <vscale x 4 x i32> %27)
  br label %for.cond.cleanup
```

```
for.cond.cleanup:
  ret void, !dbg !40
```

```
permute.decision:
  %30 = call <vscale x 4 x i1> @llvm.aarch64.sve.ptrue.nxv4i1(i32 4)
  %31 = call i64 @llvm.aarch64.sve.cntp.nxv4i1(<vscale x 4 x i1> %30, <vscale
  ... x 4 x i1> %26)
  %32 = call i64 @llvm.aarch64.sve.cntp.nxv4i1(<vscale x 4 x i1> %30, <vscale
  ... x 4 x i1> %28)
  %33 = add i64 %31, %32
  %34 = icmp uge i64 %33, 4
  br i1 %34, label %lane.gather, label %linearized
```

```
lane.gather:
  %35 = call <vscale x 4 x i1> @llvm.aarch64.sve.ptrue.nxv4i1(i32 4)
  %36 = call <vscale x 4 x i32> @llvm.aarch64.sve.compact.nxv4i32(<vscale x 4
  ... x i1> %26, <vscale x 4 x i32> %25)
  %37 = call <vscale x 4 x i32> @llvm.aarch64.sve.compact.nxv4i32(<vscale x 4
  ... x i1> %28, <vscale x 4 x i32> %27)
  %38 = xor <vscale x 4 x i1> %26, shufflevector (<vscale x 4 x i1>
  ... insertelement (<vscale x 4 x i1> poison, i1 true, i32 0), <vscale x 4 x i1>
  ... poison, <vscale x 4 x i32> zeroinitializer)
  %39 = xor <vscale x 4 x i1> %28, shufflevector (<vscale x 4 x i1>
  ... insertelement (<vscale x 4 x i1> poison, i1 true, i32 0), <vscale x 4 x i1>
  ... poison, <vscale x 4 x i32> zeroinitializer)
  %40 = call <vscale x 4 x i32> @llvm.aarch64.sve.compact.nxv4i32(<vscale x 4
  ... x i1> %38, <vscale x 4 x i32> %25)
  %41 = call <vscale x 4 x i32> @llvm.aarch64.sve.compact.nxv4i32(<vscale x 4
  ... x i1> %39, <vscale x 4 x i32> %27)
  %42 = call i64 @llvm.aarch64.sve.cntp.nxv4i1(<vscale x 4 x i1> %35, <vscale
  ... x 4 x i1> %26)
  %43 = call <vscale x 4 x i1> @llvm.aarch64.sve.whilelt.nxv4i1.i64(i64 0, i64
  ... %42)
  %44 = call <vscale x 4 x i32> @llvm.aarch64.sve.splice.nxv4i32(<vscale x 4 x
  ... i1> %43, <vscale x 4 x i32> %36, <vscale x 4 x i32> %37)
  %45 = call i64 @llvm.aarch64.sve.cntp.nxv4i1(<vscale x 4 x i1> %35, <vscale
  ... x 4 x i1> %38)
  %46 = call <vscale x 4 x i1> @llvm.aarch64.sve.whilelt.nxv4i1.i64(i64 0, i64
  ... %45)
  %47 = call <vscale x 4 x i32> @llvm.aarch64.sve.splice.nxv4i32(<vscale x 4 x
  ... i1> %46, <vscale x 4 x i32> %37, <vscale x 4 x i32> %41)
  %48 = call i64 @llvm.aarch64.sve.cntp.nxv4i1(<vscale x 4 x i1> %35, <vscale
  ... x 4 x i1> %38)
  %49 = call <vscale x 4 x i1> @llvm.aarch64.sve.whilelt.nxv4i1.i64(i64 0, i64
  ... %48)
  %50 = call <vscale x 4 x i32> @llvm.aarch64.sve.sel.nxv4i32(<vscale x 4 x
  ... i1> %49, <vscale x 4 x i32> %40, <vscale x 4 x i32> %47)
  %51 = xor <vscale x 4 x i1> %49, shufflevector (<vscale x 4 x i1>
  ... insertelement (<vscale x 4 x i1> poison, i1 true, i32 0), <vscale x 4 x i1>
  ... poison, <vscale x 4 x i32> zeroinitializer)
  %52 = call i64 @llvm.aarch64.sve.cntp.nxv4i1(<vscale x 4 x i1> %35, <vscale
  ... x 4 x i1> %49)
  %53 = sub i64 %45, %48
  %54 = add i64 %53, %52
  %55 = call <vscale x 4 x i1> @llvm.aarch64.sve.whilelt.nxv4i1.i64(i64 0, i64
  ... %54)
  %56 = xor <vscale x 4 x i1> %55, shufflevector (<vscale x 4 x i1>
  ... insertelement (<vscale x 4 x i1> poison, i1 true, i32 0), <vscale x 4 x i1>
  ... poison, <vscale x 4 x i32> zeroinitializer)
  %57 = and <vscale x 4 x i1> %51, %55
  %58 = and <vscale x 4 x i1> %51, %55
  %59 = and <vscale x 4 x i1> %58, %56
  %60 = or <vscale x 4 x i1> %57, %59
  br label %if.then
```

```
if.then:
  %arrayidx = getelementptr inbounds i32, ptr %a, i64 %24, !dbg !36
  %arrayidx3 = getelementptr inbounds i32, ptr %b, i64 %24, !dbg !38
  %arrayidx5 = getelementptr inbounds i32, ptr %c, i64 %24, !dbg !39
  %67 = call <vscale x 4 x i1> @llvm.aarch64.sve.ptrue.nxv4i1(i32 4), !dbg !45
  %68 = call <vscale x 4 x i32>
  ... @llvm.aarch64.sve.ld1.gather.sxtw.index.nxv4i32(<vscale x 4 x i1> %67, ptr
  ... %arrayidx, <vscale x 4 x i32> %44), !dbg !45
  %69 = call <vscale x 4 x i32>
  ... @llvm.aarch64.sve.ld1.gather.sxtw.index.nxv4i32(<vscale x 4 x i1> %67, ptr
  ... %arrayidx3, <vscale x 4 x i32> %44), !dbg !45
  %70 = call <vscale x 4 x i32> @llvm.aarch64.sve.mul.nxv4i32(<vscale x 4 x
  ... i1> %67, <vscale x 4 x i32> %69, <vscale x 4 x i32> %68), !dbg !45
  call void @llvm.aarch64.sve.st1.scatter.sxtw.nxv4i32(<vscale x 4 x i32> %70,
  ... <vscale x 4 x i1> %67, ptr %arrayidx5, <vscale x 4 x i32> %44), !dbg !45
  %71 = zext <vscale x 4 x i32> %44 to <vscale x 4 x i64>, !dbg !45
  call void @llvm.aarch64.sve.st1.scatter.sxtw.nxv4i32(<vscale x 4 x i32> %44,
  ... <vscale x 4 x i1> %67, ptr %arrayidx5, <vscale x 4 x i32> %44), !dbg !45
  %72 = insertelement <vscale x 4 x i1> undef, i1 %cmp1.not, i1 false, !dbg !45
  %73 = insertelement <vscale x 4 x i1> %72, i1 %cmp1.not.headerCopy.1, i1
  ... true, !dbg !45
  %74 = insertelement <vscale x 4 x i1> %73, i1 %cmp1.not.headerCopy.1.2, i1
  ... false, !dbg !45
  %75 = insertelement <vscale x 4 x i1> %74, i1 %cmp1.not.headerCopy.1.2.3, i1
  ... true, !dbg !45
  %76 = trunc i64 %24 to i32, !dbg !45
  %77 = call <vscale x 4 x i32> @llvm.aarch64.sve.index.nxv4i32(i32 %76, i32
  ... 1), !dbg !45
  br label %new.latch, !dbg !45
```

```
linearized:
  %61 = insertelement <vscale x 4 x i1> undef, i1 %cmp1.not, i1 false
  %62 = insertelement <vscale x 4 x i1> %61, i1 %cmp1.not.headerCopy.1, i1 true
  %63 = insertelement <vscale x 4 x i1> %62, i1 %cmp1.not.headerCopy.1.2, i1
  ... false
  %64 = insertelement <vscale x 4 x i1> %63, i1 %cmp1.not.headerCopy.1.2.3, i1
  ... true
  %65 = trunc i64 %24 to i32
  %66 = call <vscale x 4 x i32> @llvm.aarch64.sve.index.nxv4i32(i32 %65, i32 1)
  br label %new.latch
```

```
new.latch:
  %78 = phi <vscale x 4 x i32> [ %77, %if.then ], [ %25, %linearized ]
  %79 = phi <vscale x 4 x i1> [ %75, %if.then ], [ %26, %linearized ]
  %80 = phi <vscale x 4 x i32> [ %66, %linearized ], [ %27, %if.then ]
  %81 = phi <vscale x 4 x i1> [ %64, %linearized ], [ %60, %if.then ]
  br label %for.body
```